Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them	)	PR Docket No. 92-235

To: The Commission

REPLY COMMENTS OF
NIPPON TELEGRAPH AND TELEPHONE COMPANY

Nippon Telegraph and Telephone Corporation ("NTT"), by its attorneys, hereby replies to the initial comments filed in the instant proceeding. NTT's response will focus on the arguments raised by various parties who oppose the adoption of a 5 kHz channelization plan, which represents the most spectrum-efficient, technologically feasible solution to the pressing problems identified by the Commission in the Notice of Proposed Rulemaking, 7 FCC Rcd 8105 (1992) ("NPRM").

I. ADOPTING 5 kHz CHANNEL SPACING FOR ALL

than predicted eight years ago, see Associated Public-Safety Communications Officers ("APCO") Comments at 5 -- has imposed even greater demands on already scarce spectrum resources.[1/]

While acknowledging the compelling need for enhanced spectrum efficiency, several parties advocate the adoption of 12.5 kHz channel spacing, as either an interim or final channelization scheme; those who view it as an interim measure generally support the eventual adoption of 6.25 kHz channels.[2/] Others, while acknowledging the gravity of the situation, apparently would prefer that the Commission take no action at this time, although they do offer grudging support for the 12.5 kHz solution.[3/] However, as is demonstrated below, neither half-measures nor further delay represent a rational solution to the pressing problems identified in the NPRM.

1/ While certain rural areas arguably have not yet begun to experience the same level of spectrum congestion typical of urban centers, see, e.g., International Municipal Signal Association, et al. ("IMSA") Comments at 15; Montana Power Company Comments at 1, that does not justify delaying the Commission's refarming effort to the detriment of what would appear to be the vast majority of private land mobile radio service ("PLMRS") users.

2/ See, e.g., APCO Comments at 14, 21; Land Mobile Communications Council ("LMCC") Comments at 8, 10, 13;

A. Proposals That Effectively Would Maintain The Status Quo Are Wholly Inadequate.

Several commentators, including Ericsson GE Mobile Communications, Inc. ("Ericsson"), propose the adoption of an undefined "spectrum efficiency standard." See, e.g., Ericsson Comments at 15. They find such a "standard" preferable to any specific reductions in channel bandwidth, at least for the foreseeable future.

Put simply, adoption of an amorphous spectrum efficiency standard alone does not offer a serious alternative to channel-splitting, in view of the urgent, near-term need for additional channels that has been recognized by virtually all parties. While factors other than occupied bandwidth certainly could be considered as a basis for additional improvements in efficiency,[4/] Ericsson's proposal, devoid of any details, is inadequate per se; it is merely a prescription for maintenance of an unacceptable status quo.

Similarly, speculation by some parties that yet-to-be-developed technologies may require bandwidths in excess of 5 kHz does not provide a rational basis for delaying the adoption of a 5 kHz channelization plan.[5/] Plainly, no matter how the spectrum is refarmed, future services may require more bandwidth than presently is anticipated. Taken to its logical conclusion, Motorola would have the Commission stay its hand until such time

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4/ See, e.g., APCO Comments at 10; TIA Comments at 9; NABER Comments at 5; Bendix/King Radio Corp. ("Bendix/King") Comments at 2.

5/ See, e.g., Motorola Comments at 5; APCO Comments at 11; AAR Comments at 26.

as it is confident that all technical progress has been exhausted, so that the new regulations can perfectly accommodate all possible technologies.

Those who propose such vague measures -- for fear that anything more precise will foreclose future opportunities -- ignore the most basic aspect of the Commission's regulatory mandate. The Communications Act specifically grants to the Commission broad and flexible regulatory powers sufficient to meet the challenges presented by dynamic and everchanging technologies. See, e.g., National Broadcasting Co. v. U.S., 319 U.S. 190, 214-18 (1943). In this proceeding (as in all others), the Commission is free to adopt the best solution that it is confident can be implemented without undue dislocation (e.g., with an appropriate transition period), secure in the knowledge that it possesses the flexibility to adjust its regulatory structure in response to future technological advances. See, e.g., WAIT Radio v. FCC, 418 F.2d 1153 (D.C.Cir. 1969).

B. Reliable 5 kHz Technology, With Performance Characteristics Equal To Or Better Than 12.5 kHz Systems, Is Currently Available.

NTT submits that a move to 5 kHz channelization provides the best practical response to the critical problems confronting the Commission. Other parties agree.[6/] However, some commentators suggest -- without any substantiation -- that reliable narrowband equipment will not be available within a

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[6/] See, e.g., Uniden America Corp. ("Uniden") Comments at 3; SEA, Inc. ("SEA") Comments at i; Securicor PMR Systems Ltd. ("Securicor") Comments at 7; Advanced Mobilecomm, Inc. ("Advanced Mobilecomm") Comments at 4.

time-frame consistent with the Commission's refarming proposal.[7/] The fact is that 5 kHz technology exists now and can be widely available in commercial quantities in the near future.

For example, NTT's RZ SSB technology has been rigorously tested in the laboratory and field-tested in metropolitan Tokyo, with uniformly positive results. See NTT Comments at 4 and Technical Appendix.[8/] Equipment incorporating RZ SSB technology will be on the market within the next two to three years. NTT Comments at 3. Other manufacturers, such as SEA and Securicor, already are manufacturing and marketing 5 kHz equipment.[9/]

Critics have cited no standard of performance or reliability that 5 kHz equipment does not satisfy. The uncontroverted evidence in the record clearly establishes that 5 kHz technology is capable of producing voice quality and data transmission equal to or better than existing 25 kHz or 12.5 kHz

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7/ See, e.g., APCO Comments at 13; TIA Comments at 4; Motorola Comments at 8; Ericsson Comments at 10; APCO Comments at 21; LMCC Comments at 6; NABER Comments at 10; Bell Atlantic Comments at 2; E. F. Johnson Company ("E. F. Johnson") Comments at 5.

8/ As is demonstrated in both the Technical Appendix attached to NTT's Comments and in the Supplemental Technical Appendix attached hereto, the results obtained in these field tests refute the unsubstantiated claim made by Ericsson that very narrowband systems suffer from a host of theoretical defects. See Ericsson Comments at 10-11.

9/ See SEA Comments at 1; Securicor Comments at 5; Advanced Mobilecomm Comments at 13.

equipment,[10] at power levels equal to or less than required to produce the same range of results when compared with wider band equipment. See Uniden Comments at 4; Securicor Comments at 5. These systems can handle all relevant PLMRS applications, including high quality voice, 9600 bps data,[11] and G3 facsimile.[12] Moreover, contrary to TIA's unfounded claims, use of narrow-band technology will not cause "serious intermodulation interference effects" due to the proliferation of channels. TIA Comments at 12. Indeed, RZ SSB technology is strongly resistant to interference and fading, and will allow for full adjacent channel loading. See Supplemental Technical Appendix.

The only "evidence" of problems with narrowband technologies that the critics are able to muster relies on a patent mischaracterization of earlier experiences with 5 kHz systems in the 150-174 MHz band. See, e.g., Motorola Comments at i; TIA Comments at 11. In the Commission's own words, these

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[10] See NTT Technical Appendix at 4; Securicor Comments at 2, 6; see also NTT Supplemental Technical Appendix (attached hereto) at 3.

[11] In its Comments, at Exhibit 4, pp. 4-22, Securicor makes the observation that "SSB is completely unable to cope" with data transmitted at 9.6 kbps. That may be so. However, a SSB system augmented by NTT's RZ SSB technology will provide 9.6 kpbs performance superior to FM. See NTT Comments, Technical Appendix at 1, 4.

[12] See NTT Comments at 2. See also Uniden Comments at 5; SEA Comments at 9; Securicor Comments at 6; Advanced Mobilecomm Comments at 10. As is demonstrated in the Technical Appendix to NTT's Comments, at 4, RZ SSB technology is capable of meeting the service needs identified by the public safety community as crucial for next-generation systems, including, inter alia: fingerprints, maps, criminal records, building diagrams, and similar data. See APCO Comments at 4.

problems were caused by the "[u]se of 5 kHz narrowband channels in spectrum already occupied by PLMR users employing 25 kHz

needed to facilitate communication at narrower bandwidths has not yet been developed. Similarly, 6.25 kHz channels are a logical "next step" only in the event that 12.5 kHz channelization is a rational starting point. A 5 kHz channel scheme would provide 25% more channels than 6.25 kHz channelization, and no loss in system "flexibility."[14/]

As compression technology advances, NTT has no doubt that 5 kHz channels will be able to accommodate other future applications, and stacking of channels (contiguous or otherwise) could be used to create wider channels if needed.[15/] The Commission can be confident that the marketplace will react to any new channelization plan by providing products and services responsive to user needs within the prescribed regulatory framework. Consumer choice will be enhanced, because manufacturers will have every incentive to compete in order to meet demand for new products tailored to user needs.[16/]

14/ While 5 kHz channelization, if adopted, arguably might inhibit the development of 6.25 kHz equipment, see, e.g., NABER Comments at 13, such a concern is entirely illusory. At present, there are no commonly used applications that require, at an absolute minimum, 6.25 kHz bandwidth.

15/ Additionally, the failure to adopt a narrowband standard may preclude future applications requiring many channels. See, e.g., the Intelligent Vehicle-Highway Society of America ("IVHSA") Comments at 3. A 5 kHz channel will be able to support intelligent vehicle services, see SEA Comments at 9, and narrowband channelization will guarantee that sufficient channels exist for such increasingly important applications.

16/ While this marketplace response will, over time, render obsolete (or otherwise unattractive to consumers) various products presently considered to be competitive, see, e.g., Motorola Comments at iii-iv, that is an inescapable consequence of progress and competition. Some parties have suggested that the normal amortization period of the radio

(continued...)

II. A MOVE TO 5 kHz CHANNELIZATION IS THE MOST COST-EFFECTIVE SOLUTION TO SPECTRUM CONGESTION.

Some manufacturers with investments in wideband product lines and inventories claim that cost considerations preclude a mandated shift to 5 kHz channel spacing.[17/] Such concerns are entirely unfounded. Indeed, a narrowband channelization scheme is the most cost-effective solution to radio spectrum congestion. All efficiency improvements, large or small, will involve unavoidable costs to manufacturers and users. The burden associated with such costs can be borne relatively painlessly, though, by adoption of a transition period sufficient to allow amortization of existing investments.

Moreover, a move directly to 5 kHz channel spacing, rather than a staggered, multi-stage drift toward 6.25 kHz channels, is the lowest cost option in the long run. A move to 12.5 kHz channel spacing will require a complete changeover of equipment for most users. See, e.g., Ericsson Comments at 5;

Finally, 5 kHz equipment will be no more costly than 12.5 kHz equipment. For example, NTT's RZ SSB technology primarily relies on off-the-shelf components and can be produced for roughly the same price as currently available systems. See NTT Comments at 2. Similarly, 5 kHz equipment can function with antennas and combiner equipment now typically used with wideband equipment. See Uniden Comments at 4. Thus, the concerns expressed by the entrenched manufacturers regarding the cost of next-generation technology must be viewed with a great deal of skepticism.

CONCLUSION

Based on the evidence assembled in this proceeding, NTT submits that the public interest would be served by adopting a 5 kHz channelization scheme, with the shortest transition period consistent with the need for amortization of existing investments.

Respectfully submitted,

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SUPPLEMENTAL TECHNICAL APPENDIX

This Supplemental Technical Appendix, which expands upon the Technical Appendix filed with NTT's comments in this proceeding, demonstrates how common limitations on frequency and time-space utilization can be overcome by use of RZ SSB technology.

1. Channel Spacing and Carrier Separation.

Single Channel Per Carrier ("SCPC") systems[1/] require frequency guard bands for each channel on the frequency axis. In the case of RZ SSB, which can support

3/ In the case of digital cellular systems employing

utilization. RZ SSB technology does not suffer from this limitation.

3. Diversity Reception.

Space diversity reception (use of several antennas) greatly improves the quality of signals demodulated in severe fading environments. When at least one of two parties communicating with each other is travelling at high speed,[3/] space diversity reception should be used. This is especially true for data transmission, which requires high quality.

The improvement achieved by space diversity reception is fully realized, even when the distance between two antennas decreases to one-tenth of the wavelength. Diversity techniques also greatly improve immunity against interference for land mobile radio systems. Field tests utilizing an equal gain combining method have proven that the space diversity technique can be used to achieve excellent reception in the RZ SSB receiver.

3/ Space diversity reception is not required at very slow speed, such as walking speed.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Reply Comments of Nippon Telegraph and Telephone Corporation were

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